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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/065,720 | 11/13/2002 | Casey J. Grant | BUR920010212 | 6154 |
| 30449 | 7590 | 04/07/2004 | EXAMINER | |
| SCHMEISER, OLSEN + WATTS SUITE 201 3 LEAR JET LATHAM, NY 12033 | | | DEO, DUY VU NGUYEN | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1765 | |

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|--|--------------------------------------|-------------------------------------|--|
| <p align="center">Office Action Summary</p> | Application No. 10/065,720 | Applicant(s) GRANT ET AL. | |
| | Examiner DuyVu n Deo | Art Unit 1765 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 17-20 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2002 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/13/02</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 5-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Ito et al. (US 6,274,505).

Ito describes a method for processing a substrate comprising: providing a substrate having upper, lower opposite surfaces and an edge between the upper and lower surfaces (col. 6, line 50-55; figure 1); processing the upper surface with a solution (col. 7, line 4-5); supplying a fluid against the lower surface including the circumferential portion or edge of the substrate and controlling the T of the fluid in order to cool or heat the circumferential portion to provide an uniform etching of the substrate (col. 4, line 20-25; col. 7, line 20-34; col. 8, line 17-24, line 34-42; col. 10, line 39-47).

Referring to claim 2, the substrate is a semiconductor substrate (col. 1, line 9).

Referring to claim 5, heating the substrate would read on claimed increasing the T of the fluid above an ambient T (col. 8, line 34-42). Referring to claim 6, increasing the T of the substrate would also increase T of the etchant; therefore increasing the etch rate of the substrate.

Referring to claim 7, cooling the substrate would read on claimed decreasing the T of the fluid below an ambient T (col. 10, line 39-47). Referring to claim 8, decreasing the T of the

substrate would also decrease the T of the etchant; therefore, decreasing the etch rate of the substrate.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Futase et al. (JP 11-245143) and Ito et al. (US 6274,505).

Futase (US 6,586,161) claims the foreign priority to the JP 11-245143. Therefore, the US patent 6,586,161 would be used as the translation of JP 11-245143.

Futase describes a method for processing a semiconductor substrate comprising: providing a substrate having two surfaces (claimed upper and lower surfaces) and an edge between the upper and lower surfaces (fig. 11); providing a chuck for elevating the substrate above an upper surface of the chuck using a suspension fluid, which delivered from an annular opening located proximate to an edge of the chuck, the fluid in contact with the bottom surface proximate to the edge of the substrate (fig. 12, 14; col. 14, line 1-5); processing the top surface of the substrate with a first fluid (col. 13, line 52-55; col. 14, line 5-10). Unlike claimed invention, Futase doesn't describe controlling or maintaining the temperature, T, of the suspension fluid at temperature different from the ambient temperature in order to affect the processing of an edge region of the top surface of the substrate.

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Ito describes a method for processing a substrate comprising processing the upper surface with a solution (col. 7, line 4-5) and supplying a fluid against the lower surface including the circumferential portion or edge of the substrate and controlling the T of the fluid by heating or cooling it (claimed maintaining it at T different from the ambient T) (col. 4, line 20-25; col. 7, line 20-34; col. 8, line 17-24, line 34-42; col. 10, line 39-47). It would have been obvious for one skill in the art at the time of the invention to modify Futase in light of Ito because Ito teaches that controlling the T by heating or cooling the T would provide uniform T profile of the substrate and improve the etching uniformity over entire of the surface (col. 3, line 45-col. 4, line 5).

Referring to claims 3 and 4, Futase describes the suspension fluid is nitrogen (col. 14, 2).

Referring to claims 5, 14, heating the substrate would read on claimed increasing the T of the fluid above an ambient T (Ito: col. 8, line 34-42). Referring to claim 6, increasing the T of the substrate would also increase T of the etchant; therefore increasing the etch rate of the substrate.

Referring to claims 7, 14, cooling the substrate would read on claimed decreasing the T of the fluid below an ambient T (Ito: col. 10, line 39-47). Referring to claim 8, decreasing the T of the substrate would also decrease the T of the etchant; therefore, decreasing the etch rate of the substrate.

Referring to claims 12, 16, Futase describes rotating the chuck (col. 14, line 10-15).

Referring to claim 9 and 10, Futase's chuck would read on claimed Bernoulli chuck since it can provide functions as that of the claims. Even if it is not the case, Bernoulli chuck is known to one skill in the art at the time of the invention for processing a substrate (please see cited art

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below). Therefore, at the time of the invention, using any chuck including a Bernoulli chuck would be obvious as long it can support a substrate and provide a fluid at the bottom surface of the substrate. Using a Bernoulli chuck would provide claimed invention with a reasonable expectation of success.

Referring to claim 11, applied prior art is silent about the top surface is processed at ambient pressure. However, since it is processed by a solution and not a gas, it would have been obvious to one skill in the art that the process is done at ambient pressure.

Referring to claim 15, Ito suggests using a sensor to control the temperature of the fluid (col. 8, line 30-33, line 55-60). Therefore, it would have been obvious at the time of the invention for one skill in the art to use a T sensor in order to sense the T at the edge of the substrate to provide an uniform T profile of the substrate for etching with a reasonable expectation of success.

Election/Restrictions

5. Applicant's election with traverse of claims 1-16 is acknowledged. The traversal is on the ground(s) that the search and examination of the entire applicant could be made without serious burden. This is not found persuasive because applicant has not traversed the reason showing the distinctiveness of the two inventions from each other in the previous action.

The requirement is still deemed proper and is therefore made FINAL.

6. Engesser (US 2002/0050244) is cited to show prior art (paragraphs [0012]-[0014]).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 571-272-1462. The examiner can normally be reached on 6:00-3:30; with alternate Friday off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DVD

4/1/04

A handwritten signature in black ink, appearing to be 'JD' or similar, written below the date.